SOME ASPECTS OF HIGHWAY RESEARCH

BY

AHMET MUNCI OZELSEL

B.S., Robert College, Istanbul, Turkey, 1939.
M.S., University of Illinois, 1941.

AN ABSTRACT OF A THESIS

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Acknowledgment

The writer is deeply indebted to his advisers and teachers, J. S. Crandell, Professor of Highway Engineering, and C. C. Wiley, Professor of Civil Engineering, University of Illinois, for the suggestions made in the course of this study.

Mr. F. N. Barker, Engineer of Research, Division of Highways, State of Illinois, has supplied much of the data presented, and has granted permission for its use in this thesis. The writer extends his appreciation to Mr. F. N. Barker and his associates at the Bureau of Highway Research for their kind assistance.

Mr. W. H. Munse has been greatly helpful in the preparation of this study, for which the writer expresses his gratitude.

SOME ASPECTS OF HIGHWAY RESEARCH

I. Introduction

The introduction of motor vehicles to the market and their popularity among people has opened a new era in the road construction. Travelling became such a common need and necessity and transportation on highways proved so helpful, easy, and economical to the public that the number of vehicles operating on the highways had increased at an enormous rate. As a direct consequence of the increase in the number of vehicles, their speed and hauling capacities, the need for improved roads to satisfy these growing demands has become more obvious. The highway engineer has tried to keep up with the development of these motor vehicles but has lagged behind to the extent that most of the roads constructed only ten years ago do not seem to fulfill the demands of the present time.

During the period of development of the present highways, a limited number of research studies might have been the only source of factual data for the engineer who, consequently, has had to rely largely or possibly completely on his own experience or judgment for the planning and designing of the highways. Hence most of the roads in the past have been planned and designed, to a large extent, on nothing more than assumptions and guess work. Judgments, based only on past experience, seem quite insufficient at the present time.

To be able to serve the present and future demands on the roads more effectively and efficiently, improvements of the principles and practices in highway location, planning, and construction seems very necessary. The highway engineer and locator must start basing their analyses on factual data and not on mere experience or judgment. Surveys and studies planned especially to bring forth the data so essen-

tial to adequate road development with their proper interpretation can be obtained by extensive research which may be defined as *highway research.* The data obtained by such highway research must then be used to assist the highway engineer in making accurate study and analysis upon which to base his decisions.

Highway research should be so arranged and planned as to supply the enginneer with every detail relating to all aspects of the problem so that he can make his design for a particular road as well as for a system of roads with the confidence and assurance that his design will be economical, safe, and efficient. He should have no question unanswered and no doubt unsettled before his final decision is reached.

II. Highway Research

The highway research consists of three main phases: inventory, traffic, and financial. The type of facts assembled under each phase is indicated in a general way by its name, and the procedures of assembling the different data can be summarized as follows:

1. *Inventory.* The purpose of the inventory survey is to obtain a complete picture of existing facilities. The information is obtained by actual field observations on every mile of rural roads and arterial streets. While driving over the roads, engineers record the width, type, and condition of all roadway surfaces; the type, dimensions, and condition of all structures; the location of all rural dwellings, industrial and agricultural establishments, schools, churches, and similar developments which contribute to the road use; and the detailed physical characteristics of all rural railroad crossings.

From the data furnished by these surveys, county maps are drawn showing all the pertinent data about the existing roads and arterial streets and the establishments and developments along them. These maps form the fundamental and basic data necessary for determining the improvements needed on the existing roads and its facilities, and further

indicate definite outlines that can be followed for the planning and construction of new roads. To a highway engineer then, these maps are sources of suggestion and perhaps instruction for the attainment of safe, efficient, and economical road systems. The road inventory data can be applied to routing of proposed roads, speed zoning, planning detours and emergency reroutings, etc.

2. *Traffic.* In order to meet the demand for more efficient and better roads, to avoid congestion and the hazards resulting therefrom, and to facilitate traffic movements, various governmental agencies can frequently resort to traffic surveys for factual data upon which to base their program of planning and improvement of highways and the establishment of traffic regulations.

To present a complete picture of road usage, it is necessary to know the number and kinds of vehicles using each section of road for various units of time. Correct information can be obtained by taking traffic counts, using traffic counters placed at the desired locations along the roads. The traffic volumes thus obtained are plotted on county traffic maps indicating the trend of traffic at every locality.

The highway engineer is interested in the reduction of accidents and congestion. The determinination of locations needing primary attention for improvements requires a knowledge of the total vehicle-miles of travel on certain routes and within certain areas. A study of traffic volumes gives a comparison of the relative importance of areas, routes, and intersections. With all factors being equal, the highest amount of vehicular traffic serves as a criterion of those areas and roads which deserve first consideration. The traffic data can be applied for signs and signal warrants in rural areas, and within municipalities, routing traffic, studying accidents and their preventions, directional and informational signing, and police assistance.

3. *Financial.* The economic studies should be designed to give information concerning the revenues and expenditures of the highway system so that necessary improvements

can be based on factual data. For proposed road systems, economic studies bring forth the expected revenues and expenditures or the allocations thereof, hence, distribution of taxes to be collected from different sources can be determined. The results of these surveys, supplemented by the findings of the other surveys mentioned, then can lead to an efficient and economical road system.

The importance of the principles of highway research and their effective application which lead to efficient and safe road system can not be overemphasized. This science should be introduced to every young highway engineer. The improvements to be made on the existing roads and the economical designing of the future roads should not be based alone on individual knowledge or experience. The highway research must be the source of factual data through which road systems to serve the public adequately can be established and maintained.

Vita

Ahmet Munci Ozelsel was born in Izmir, Turkey, August 26, 1917. He finished grade school in 1929 and entered Robert College, Istanbul, Turkey, where he graduated from the Academy in 1935 and received his Bachelor of Science in Civil Engineering in 1939.

Majoring in Structural Engineering, he received his Master of Science degree from the University of Illinois in February 1941.

He was employed by the State of Illinois as a Junior Highway Engineer in the Bureau of Highway Research from February 1941 to August 1941. He worked as a Designing Engineer at the Public Utility Engineering and Service Co., and Freyn Engineering Co. in Chicago, Illinois, until June 1942.

In June 1942 he came to the University of Illinois and carried on work in the Graduate School. In October 1943 he was appointed as Special Research Assistant at the University of Illinois.

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